Governments use a pig pandemic to expand corporate power and crush small farms



Nelson Aquino observes his pig farm after pigs died of African swine fever, in Palmarito, Monte Cristi, Dominican Republic. August 1, 2021. Photo: Reuters/Ricardo Rojas

In May 2021, pigs started dying in large numbers from a mysterious disease in different villages in the Dominican Republic, near the border with Haiti. The local farmers were distraught and desperate. They called the authorities and pleaded for the government to identify the disease so that they could figure out some way to deal with it.

"If it's not stopped, no pigs will be left alive here", said Evangelista Con, a farmer from Montecristi province who lost all of her 22 pigs to the unknown disease.¹

Some farmers posted videos of their dead pigs to YouTube to try and attract attention.² And reports began circulating of outbreaks in other parts of the country.

¹Garcia Rosario, "Brote neumonia afecta a cerdos," Diario Libre, 28 June 2021: https://www.pressreader.com/dominican-republic/diario-libre-republicadominicana/20210628/282119229517132

²For example: https://www.youtube.com/watch?v=skuUQCzjBXg

By late June, talk of the mysterious disease was all over the country's media.³ Thousands of pigs were dead, small farmers were in ruins, and consumers were shying away from pork.

It was only then that the government reacted. After visiting some of the farms and conducting autopsies, the animal health authority stated publicly that it was simply a matter of a pneumonia, which, according to the government, had killed only around 60 young pigs on eight backyard farms in the northwest.⁴

The government's Director of Animal Health, Dr Rafael Bienvenido Nuñez Mieses, said the deaths were caused by poor sanitary and feed practices on backyard farms.

"The presumptive diagnosis is pig pneumonia. Taking into account that these pigs were bought in modern farms, where they have vaccination programmes against viruses and other diseases. These pigs were moved to backyard areas on the border, where the physical and feeding conditions produce health challenges," said Nuñez Mieses, in an official statement released on June 29th. "It is an inevitable health issue that occurs permanently in backyard pigs because they do not have adequate sanitary and feeding conditions...We have the necessary medicines to tackle this situation and it is already under control".

A few weeks later, in a radio interview, Dr Nuñez Mieses reiterated that the disease was only a problem of backyard pigs in the border areas and assured listeners that the situation was under control and was not affecting other areas of the country, like La Vega, where the large, industrial pig farms are concentrated. "The problem started in the border area and that is where it is contained."⁵

He was dead wrong. On July 28, 2021, a US lab confirmed the worst: samples collected from dead pigs were positive for the lethal African Swine Fever (ASF).⁶

ASF returns to the Americas after 40 years

ASF is a deadly pig disease that led to the eradication of the entire pig herd on the Island of the Dominican Republic and Haiti when it last struck the Caribbean in the late 1970s. A new ASF variant emerged in Eastern Europe in 2007, and has since spread to Asia-- leading to the death of around a quarter of all pigs on the planet. ASF is a highly persistent disease that can be transmitted from an affected operation

³For a sense of the media coverage in late June early July see:

https://www.youtube.com/watch?v=p11I0EBcm80; https://almomento.net/republica-dominicana-alerta-sobre-brote-de-neumonia-en-cerdos/; https://infocerdo.com/contenido/638/republica-dominicana-criadores-de-cerdos-piden-la-ayuda-del-gobierno-tras-mortan; https://domiplay.net/video/causa-de-muertes-de-cerdos-29-06-21-telenoticias-of-pus; https://www.youtube.com/watch?v=4hcjlhLK5IU; https://www.youtube.com/watch?v=y9H1kheQeU8

⁴The Official communication from the government's department of health, dated June 29, 2021, is here: https://www.ganaderia.gob.do/index.php/noticias/item/455-direccion-de-ganaderia-mantiene-vigilancia-sobre-enfermedades-en-cerdos

⁵ El Patron de la tarde: podcast, "Conversamos con Rafael Bienvenido Núñez Mieses," 26 July 2021: https://www.youtube.com/watch?v=YOctZ4DTgjg

⁶Reuters, "African swine fever confirmed in Dominican Republic pigs -USDA," 28 July 2021: https://www.reuters.com/world/americas/african-swine-fever-confirmed-dominican-republic-pigs-usda-2021-07-28/

to another in multiple ways-- from dirty boots, the wheels of a truck, contaminated meat, the movement of live pigs and, perhaps most importantly, the trade in animal feed. With the global interconnectedness of today's pork industry, all countries with pig herds are or should be on high alert for signs of this ASF variant. The Dominican Republic, evidently, was not.

Back in early April 2021, over 200 pigs died of disease at an enclosed farm in the municipality of La Vega, in the centre of the country and in the heartland of its industrial pig farming sector and pig breeding. The government collected samples but did not undertake tests, until later in July, when these samples were sent along with a batch of samples collected from other farms with outbreaks. According to an official report of the World Animal Health Organisation (OIE) published on August 25th, 2021, this farm is listed as having the country's first ASF outbreak, beginning on April 10th.

This would help to explain how ASF spread so rapidly across the country. ASF is deadly, but transmission from pig to pig occurs slowly. If there is an isolated outbreak at a backyard operation, it can be quickly and effectively controlled, as has happened in other countries.⁷ But if ASF gets into an industrial operation-- whether a breeder farm, a hog barn, a feed mill or a meat plant, then multiple routes for transmission open up, and the disease can quickly get out of control. This is what happened in Eastern Europe and Asia, and it is likely what happened in the Dominican Republic since La Vega's pig farming companies supply piglets, feed and other products to industrial and backyard farms throughout the country.⁸ Dr. Bolívar Echevarria, a veterinarian in the country's northwest, working with pig farmers, says the disease could also have been inadvertently spread by the technical staff of the Ministry of Agriculture, who went from farm to farm in June thinking the disease was pneumonia.⁹

The Dominican Republic is now scrambling to deal with the situation at a huge cost to the country's small pig farmers. The government's "Plan A" involves a mass cull of all backyard pigs that are within a 3km radius of outbreaks or that are near to industrial farms, in an effort to protect the bigger players. In areas where there are outbreaks, only backyard pigs are being culled, not the pigs on the industrial farms. ¹⁰ Farmers are being compensated for culled pigs, but not for those that died from ASF. If "Plan A" fails to stop ASF from entering the industrial pig farms, then the government will proceed with "Plan B", which involves the complete eradication of all pigs in the country and perhaps the entire island, including Haiti where the disease has already been detected in a border town. ¹¹

⁷This is the situation in Germany, Ukraine, and neighbouring countries to the initial Georgia outbreak. See GRAIN, "Building a factory farmed future, one pandemic at a time," 3 March 2021: https://grain.org/e/6418
⁸GRAIN, "Building a factory farmed future, one pandemic at a time," 3 March 2021: https://grain.org/e/6418
⁹Personal communication, 17 September 2021.

¹⁰This was confirmed by personal communications with Dr. Bolívar Echevarria and a pig farmer in an affected area of the northwest of the country.

¹¹333 Latinoamérica, "Situación actual de la Peste Porcina Africana en República Dominicana", webinar, 31 August 2021: https://www.youtube.com/watch?v=0S7V-ewrsAQ

Plan A is already faltering. ASF has now spread to all the country's pig farming provinces, and several outbreaks have taken place on industrial farms, including breeder farms. According to Francisco Israel Brito, the president of the Dominican Federation of Pig Producers, 98 per cent of the country's pig population is "epidemiologically compromised".¹²

Dr. Echevarria says that small pig farmers in the Dominican Republic have another theory. They think that Plan A is not about eradicating the disease but eliminating small farmers so that the big meat companies and pig farmers can assert a monopoly over the market.

Profiting from disease

Today's industrial pig farming industry in the Dominican Republic was born from the ASF outbreak of the late 1970s, when the entire national herd was eradicated. It was afterwards that politicians and businessmen began investing in industrial pig farms, and high-yielding breeds of pigs replaced traditional varieties. Over the decades, these industrial pig farms, connected to global suppliers of genetics, equipment, feed, medicines and consultants, have come to dominate national production, and have brought to the island the dreaded diseases afflicting today's globalised, industrial pig sector-- such as Classical Swine Fever and porcine epidemic diarrhoea.¹³

As with many other countries where ASF is now present, industrial pig farms in the Dominican Republic are highly dependent on imports of feed ingredients. According to an owner of one of the country's largest pig farming operations, about 50,000 trucks are needed every year to drive imported feed and other products from the ports to pig farms. It is now well established that ASF can persist in feed ingredients through processing and long-distance transportation, and this is why some countries, like Canada, have started implementing border controls on feed ingredient imports from ASF-affected countries. Given that the Dominican Republic does not have such controls, feed could easily have been the vector for ASF's entry into the island.

¹² As stated on 333 Latinoamérica, "Situación actual de la Peste Porcina Africana en República Dominicana", webinar, 31 August 2021: https://www.youtube.com/watch?v=0S7V-ewrsAQ

¹³According to Lissette Gómez, Director of Animal Health for the Dominican Republic, the last time the Dominican Republic faced a major swine disease outbreak was in 2014 when "consultants" from the US visiting an industrial farm brought the dreaded porcine epidemic diarrhoea.

https://www.aphis.usda.gov/animal_health/animal_dis_spec/swine/downloads/meeting/presentations/24%2 0-%209%20-%20Gomez.pdf

¹⁴This was stated by the President of the Junta Agroempresarial Dominicana, Osmar Benítez in "La peste porcina africana 'acaba' con la crianza en traspatios," Diario Libre, 11 August 2021:

https://www.diariolibre.com/economia/la-peste-porcina-africana-acaba-con-la-crianza-en-traspatios-GC28088493

¹⁵ Aerin Einstein-Curtis, "ASF: Canada amends feed import rules, Canadian Pork Council," Feed Navigator, April 2019: https://www.feednavigator.com/Article/2019/04/05/ASF-Canada-amends-feed-import-rules; Canada Pork Council, 'What's hitching a ride in your feed?': https://www.cpc-ccp.com/asf-feed

Despite these concerns with commercial feeds, the OIE has not made them a central part of its global effort to combat ASF.¹⁶ Indeed, most countries around the world have not implemented controls on imports of commercial feeds or feed ingredients to deal with ASF, and few even recognise commercial feeds as a possible source of transmission. Governments have instead been cracking down on small farms for using household wastes, known as swill feed, under the recommendation from the United Nation's Food and Agriculture Organisation (FAO).¹⁷ This, plus the increase in factory farmed pigs, which consume high levels of commercial feed, is generating more demand for commercial feeds and, thus, increasing the trade in feed ingredients and creating more risks for transmission across borders.¹⁸ In China, for instance, prohibitions on swill feed introduced after the initial ASF outbreaks in 2018 have led to an additional import of up to 30 million tons of maize and 10 million tons of sovbean meal for feedstock.¹⁹

ASF is boosting the pork trade too, which is another vector in the spread of the disease. On the one hand, the mass culls used to control the disease destroy much of the local supply and increase the price of pork, paving the way for corporations to fill the void with imports.²⁰ China is the obvious example-- it quadrupled its pork imports after ASF struck, taking in nearly half of the world's total pig meat exports-and the profits of big meat companies like WH Group (Smithfield) soared.²¹ Now the Chinese government is supporting its corporations to go overseas to build pig farms that can supply China, such as the controversial US\$27 billion deal it began negotiating with Argentina in 2020. The deal aims for the construction of 25 mega pig farms and would increase Argentina's pig population from 6 million to 100 million pigs.²²

On the other hand, because governments are pursuing measures against ASF that prioritise corporate pig farms and export supply chains at the expense of small scale

¹⁶The OIE's fact sheet for prevention and control of ASF (updated March 2021) makes no mention of commercial feeds as a risk. See: https://www.oie.int/app/uploads/2021/03/african-swine-fever.pdf ¹⁷See for instance, the FAO's advice on swill feeding and ASF in which it states: "bans on swill feeding are a goal to be aimed at from the point of view of disease prevention". See:

http://www.fao.org/ag/againfo/programmes/en/empres/gemp/cont-plan/cp-asf/asf3400-swill.htm ¹⁸ In large factory farms with more than 1,000 sows, wheat and maize account for 65% of feed or 215 kg per pig, compared with 50% for commercial farms of less than 1,000 pigs and just 20% for farms with fewer than 50 pigs. Linda Smith, "High-Rise Piggeries: What China's Pork Industry Transformation Means to U.S. Farmers," AgWeb, 2 August 2021: https://www.agweb.com/news/livestock/pork/high-rise-piggeries-what-chinas-pork-industry-transformation-means-us-farmers

¹⁹ South China Morning Post, 'China food security: soybean imports 'exceptionally large' as pig population nears pre-African swine fever level', June 2021, https://www.scmp.com/economy/china-economy/article/3136989/china-foodsecurity-soybean-imports-exceptionally-large-pig

²⁰ For example, in the Philippines, executive orders lowered pork import tariffs and increased import quotas, despite heavy opposition from local farmers. See USDA, "Philippines: Lowering pork tariffs and raising quota volume," 18 May 2021: https://www.fas.usda.gov/data/philippines-philippines-lowers-pork-tariffs-and-raises-quota-volume

²¹ GRAIN, 'Profits above all: world's largest pork company propagates global pandemics', April 2020: https://grain.org/e/6445; Linda Smith, "High-Rise Piggeries: What China's Pork Industry Transformation Means to U.S. Farmers," AgWeb, 2 August 2021: https://www.agweb.com/news/livestock/pork/high-rise-piggeries-what-chinas-pork-industry-transformation-means-us-farmers

²² Fermin Koop, 'Argentina looks to capitalise on China's swine fever crisis', Dialogo Chino, January 2020, https://dialogochino.net/33102-argentina-looks-to-capitalise-on-chinas-swine-fever-crisis/

pig farms and meat processors, ASF outbreaks in Asia and Europe are drastically reshaping the pig farming sector. These range from mass culls of backyard pigs to rules prohibiting swill feed and free-ranging pigs to the creation of zones or compartments that are exclusive to large industrial operations so that they can continue to export meat even if ASF is present in other parts of the country (Box: What are ASF-free compartments and zones?).²³

Russian authorities, for example, responded to the emergence of ASF in the country in 2009 by culling all pigs on small farms in a 5 to 25 km radius of factory farm outbreaks, carrying out pre-emptive culls of pigs on small farms, and instituting a system of compartmentalisation to allow companies to keep exporting meat from ASF infected areas. Small farms have been devastated by these measures, even though the vast majority of pigs affected by ASF have been in large factory farms. Russia's small farms produced around 70 per cent of Russia's pork before ASF hit the country, but now they only produce about 10 per cent. And, even as ASF outbreaks continue to kill hundreds of thousands of pigs across the country every year, Russia's become one of the world's top exporters of pork.²⁴

In country after country where the ASF Georgia variant has spread, the measures pursued by governments against it have destroyed small pig farms and cleared a path for corporate meat companies and factory farms to thrive. In China, for instance, despite government attempts to industrialise the sector, small, backyard farms were still producing half of the country's pork in 2010. But now, after three years of ASF, 40% of the country's pork comes from industrial farms with less than 1,000 pigs and 40% from new, large-scale factory operations with more than 1,000 sows.²⁵

What are ASF-free compartments and zones?

Corporations and governments are preparing for a new normal in which ASF is a constant threat and for many countries, a constant presence. Such a situation, given the immediate bans imposed on pork imports from ASF countries, could be hugely disruptive for global pork companies, which have their operations concentrated in the large surplus pork producing countries. So, to keep the exports flowing, even in times of ASF outbreaks, corporations are working with the OIE, FAO, and the big pork exporting countries, such as the US, Canada, France, China and Russia, to get global acceptance for exports from "zones" or "compartments" that can be considered ASF-free, even with ASF in the country.

²³GRAIN, 'Profits above all: world's largest pork company propagates global pandemics', April 2020: https://grain.org/e/6445

²⁴Pig Progress, "Russia embraces its new global role in pork," 2 June 2020: https://www.pigprogress.net/World-of-Pigs1/Articles/2020/6/Russia-embraces-its-new-global-role-in-pork-588356E/

²⁵ Linda Smith, "High-Rise Piggeries: What China's Pork Industry Transformation Means to U.S. Farmers," AgWeb, 2 August 2021: https://www.agweb.com/news/livestock/pork/high-rise-piggeries-what-chinas-pork-industry-transformation-means-us-farmers

Zones are territories where all farms have to abide by the same "standard of biosecurity" and the movement of pigs and presence of diseases is supposed to be heavily monitored, making it difficult if not illegal for small farms and small scale meat processors to operate in these areas. Several exporting countries have already signed deals with importers to get their zone plans recognised so that pork from ASF-free "zones' can continue to be exported in case of an ASF outbreak elsewhere in the country. Canada has mutual ASF zone deals with the EU and the US, and an export agreement with Singapore, as does Australia. France is said to have recently concluded an agreement with China to have its zone plan recognised, but Germany, which has ASF within its territory, has struggled to do the same.²⁶

Zones, however, are just a stepping stone to what the big meat companies are really after-- global recognition of compartments. A compartment, according to the recently developed OIE guidelines, is a population of animals contained in one or more establishments with a specific animal health status, maintained under a defined biosecurity management system that separates it from other animal populations.²⁷ It is essentially a meat corporation's vertically integrated production system, in which all of its various farms, contract suppliers and meat plants are recognised as one "compartment" adhering to a set of biosecurity practices that are supposed to keep ASF outside of its operations. A corporation's ASF-free compartment could continue to export pork even if it has farms or a meat processing plant in an ASF-infected territory.²⁸

Last year, the number of sows held by the world's ten largest pig farming companies increased by 53% from the year before, from 7.2 million to 11.0 million, and nearly all of that increase took place in China, where pig farming companies like Muyuan and New Hope are getting funding from multilateral banks to build multi-story mega barns.²⁹ Muyuan, China's largest pig farming corporation, is building a "pig hotel"

²⁶ The information on France was provided by Guillaume Roué, President of the International Meat Society in a presentation to the conference, "Stop ASF: Public and private partnering for success', 13 June 2021: https://stop-asf.gf-tads.org/en/session/3e6b38bd-5ba8-eb11-94b3-501ac5921410. On Germany, see Reuters, "Talks with China on ending its German pork ban remain difficult -minister," 10 September 2021: https://www.reuters.com/business/healthcare-pharmaceuticals/talks-with-china-ending-its-german-pork-ban-remain-difficult-minister-2021-09-10/

²⁷ OIE, 'Compartmentalisation guidelines', 2020, https://www.oie.int/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/ASF/ASF-CompartmentalisationGuidelines EN.pdf

²⁸The exact quote in French is: "De pouvoir, malgré tout, dans des zones affectés, quelque soit les maladies, déterminé les segments de la production qui pourrait continué à commercialiser. Ça c'est le challenge de demain." Presentation to the conference, "Stop ASF: Public and private partnering for success', 13 June 2021: https://stop-asf.gf-tads.org/en/session/3e6b38bd-5ba8-eb11-94b3-501ac5921410

²⁹Pig Progress, "Who are the world's mega pork producers?" 18 June 2021:

https://www.pigprogress.net/World-of-Pigs1/Articles/2021/6/Who-are-the-worlds-mega-pork-producers-760452E/;AgriPost, "From 25million to 40 million hogs, why does New Hope Liuhe escalate pig farming?" October 2020: http://www.agripost.cn/2020/en-news_1007/500.html

complex in Henan province that will raise 2.1 million pigs a year in 21 six-story barns, with funding from the World Bank.³⁰

The Thai meat giant, Charoen Pokhpand (CP), has also taken advantage of the ASF pandemic to expand its pig farms and pork operations in China, Russia and Vietnam.³¹ In the Philippines, where CP has been operating factory pig farms for more than a decade, it has partnered with the government and the Development Bank of the Philippines in a programme to rebuild the national herd, which has been devastated since ASF hit the country in 2019. The programme, known as the Swine R3 Credit Program, will provide badly needed financing to small pig farmers, but only if they enter into contract production with CP and adopt CP's biosecurity measures. Financing will also be provided to local authorities to consolidate "backyard" pig farms into large barns to supply CP.³² This programme could convert much of the Philippines pig sector into a supply chain for CP, which sees the country as an important new base for imports of its animal feeds and exports of its processed pork.

"Our agriculture department's notion of 'recovering' our hog industry is restructuring the current dominance of small and local raisers towards that of wider and deeper foreign and corporate control,' says Lester Gueta of the Peasant Movement of the Philippines (KMP).

What should be done?

The current control measures that governments and international agencies are pursuing against ASF are not working. Not only are they having a disastrous impact on small farmers, but they are not stopping ASF, which remains a serious problem in countries where these measures have been tried, from Eastern Europe to Asia. In Russia, for example, where authorities have ruthlessly curtailed small scale pig farming and set up compartments for the large operators, 560,000 pigs died from ASF outbreaks in just three months, from November 2020 to January 2021.³³

³⁰Ashoka Mukpo, "World Bank's IFC pumped \$1.8b into factory farming operations since 2010," 7 July 2020: https://news.mongabay.com/2020/07/world-banks-ifc-pumped-1-8b-into-factory-farming-operations-since-2010/

³¹ CPF, "CPF proposes to integrate swine business in China CTI, its subsidiary, to acquire pig farms in China Profit jumps abruptly in line with business expansion plan to further growth," 14 September 2020: https://www.cpfworldwide.com/en/media-center/corporate-1436; Pig Progress, "Tönnies sells Russian pig business to CP Foods," 7 September 2021: https://www.pigprogress.net/World-of-Pigs1/Articles/2021/9/Tonnies-sells-Russian-pig-business-to-CP-Foods-789988E/; Vietnam Plus, 'CP Vietnam

builds largest pig slaughter plant in northern region', 15 May 2020, https://en.vietnamplus.vn/cp-vietnam-builds-largest-pig-slaughter-plant-in-northern-region/173403.vnp

³²"Philppines Department of Agriculture, 8 July 2021: https://www.da.gov.ph/da-dbp-and-cp-foods-launch-swine-r3-credit-program-in-batangas/; DBP, "Swine Repopulation, Rehabilitation and Recovery (Swine R3) Credit Program,": https://www.dbp.ph/developmental-banking/micro-small-and-medium-enterprises/sustainable-agribusiness-financing-program-safp/swine-repopulation-rehabilitation-and-recovery-swine-r3-credit-program/

³³Pig Progress, "ASF Russia: Over half a million pigs culled this winter," 3 March 2021: https://www.pigprogress.net/Health/Articles/2021/3/ASF-Russia-Over-half-a-million-pigs-culled-this-winter-716734E/

The international response to ASF is not stopping its global spread either. By privileging corporate control over pig production and exports, these measures amplify the risks for transmission across borders. This is not only true for ASF and other animal diseases but also for human diseases. Factory farms and industrial feed plantations are increasingly recognised as sites for the emergence of new diseases that can infect humans, while corporate meat processing plants, as we have seen with the Covid-19 pandemic, are major vectors in the transmission and amplification of disease, with especially deadly consequences for workers and their families.³⁴

A vaccine against ASF could help, and there are signs that one could soon be available. It would give small farmers confidence to restock their herds after ASF outbreaks and to keep swill feeding and free-ranging their animals. But it is far from clear that a vaccine, if it is developed, will be made widely available to small farmers. ASF was long ignored when it was confined to Africa. Now that it is threatening the industrial pig farming sector, there is more interest. But licensing deals are already being cut with pharmaceutical companies by the public labs developing ASF vaccines, and this could easily push prices out of reach for small farmers. There is, at present, no global programme for the development and deployment of vaccines with a plan for how to make the vaccines accessible to small farmers.

The big meat corporations do not seem to have much interest in a vaccine anyways. They worry that the use of vaccines on their farms and in their contract farming operations would be costly and could mess with the ASF-free status they require for exports, since, with some of the vaccine types, it would be difficult to determine if traces of ASF found in pork are from the vaccines or the disease.³⁶ In China, companies experimenting with illicit vaccines ended up spawning a new variant of ASF that is less lethal and thus more prone to escape detection and evade control measures. Why would corporations agree to vaccinate their pigs when ASF is proving to be so good for their bottom lines?

Vaccine or no vaccine, ASF is now firmly entrenched in the global pork industry and it will continue to spread. If the current approach to the disease promoted by the FAO, the OIE and governments, in close coordination with corporations, is not challenged, ASF will annihilate small-scale traditional pig farming-- and all of the biodiversity, culture and local economies that it sustains, and replace it with factory farms.

³⁴GRAIN, 'Profits above all: world's largest pork company propagates global pandemics', April 2020: https://grain.org/e/6445

³⁵The US Government, which has one of the most extensive collections off ASF samples and is one of the most advanced developers of ASF vaccines, signed a non-exclusive licensing deal for the development and commercial production of ASF vaccines with Zoetis LLC, a company owned by the controversial Bulgarian businessmen Kiril Domuschiev and Georgi Domuschiev. Information on the licensing deal: https://www.zoetis.com/_locale-assets/pdf/innovation/zoetis-approach-to-african-swine-fever.pdf. Information on the owners of Huvepharma, which owns Zoetis:

https://www.aljazeera.com/news/2021/6/18/how-bulgaria-hit-rock-bottom-on-press-freedom ³⁶See Daniel L. Rock, "Thoughts on African Swine Fever Vaccines," *Viruses*, 13(5), May 2021: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8161283/